UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/577,849	04/28/2006	Chiaki Sotowa	Q78376	4869

23373 7590 10/08/2009

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
GREGORIO, GUINEVER S	

ART UNIT	PAPER NUMBER
1793	

MAIL DATE	DELIVERY MODE
10/08/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,849	SOTOWA ET AL.	
	Examiner	Art Unit	
	GUINEVER S. GREGORIO	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4-22 and 28-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4-22 and 28-33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-22 and 28-33 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim 1, 2, 3, 7, and 11-30 of copending Application No. 10/559,615. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method and materials for making the carbon material taught by Application No. 10/559,615 are commensurate with the method and materials of making the carbon materials for App. No. 10/577,849.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claims 1-22 and 28-33 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-44 of copending Application No. 10/490,021. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method and materials for making the carbon material taught by Application No. 10/490,021are commensurate with the method and materials of making the carbon materials for App. No. 10/577,849 and therefore the carbon material is not patentably distinguishable.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-11, 21, 22 and 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. (U.S. Pub. No. 2002/0061445 A1). Kitagawa et al. teaches a negative electrode material comprised of graphite powder with a carbon precursor fired within a range of 700 to 2800 ºC (paragraph 12). Furthermore, Kitagawa et al. teaches mixing graphite particles, a carbon precursor, and a solvent which corresponds with applicant's method for making the carbon material on page 5 of the Specification wherein applicant recites a composite of carbonaceous particles and a carbon material derived from an organic compound prepared by allowing the organic compound serving as a polymer source material to deposit onto and/or permeate into the carbonaceous particles (paragraph 35). Furthermore, Kitagawa et al. teaches natural graphite which is commensurate with the carbonaceous particles taught by applicant on page of the Specification (paragraph 28). Furthermore, Kitagawa et al. teaches the carbon precursors taught by Kitagawa et al. are commensurate with the

organic compounds to be incorporated into the core material as taught by applicant on page 16 and 17 of the Specification (paragraph 31). Hence, although Kitagawa et al. does not teach "an intensity ratio of 0.1 or more for peak intensity attributed to a (110) plane to peak intensity attributed to a (004) plane determined through X-ray diffraction spectrosopic analysis on a sheet obtained by press-molding a mixture of the carbon material and a binder resin when pressed at 10^3 kg/cm^2 or higher", Examiner takes the position that the carbon material taught by Kitagawa would behave in the manner claimed by applicant because the method for making a carbon material recited by Kitagawa et al. is commensurate with applicants method for making a carbon material.

2. Furthermore, Kitagawa et al. teaches natural or artificial scaly or flaky graphite of high purity and high crystallinity which corresponds to natural graphite that has a C_0 value of a (002) plane of 0.6703 to 0.6800 (column 4, lines 45-46). Furthermore, Kitagawa et al. teaches the plane interval (d002) of (002) plane by wide angle X-ray diffraction method is less than 3.37 angstroms which corresponds to half of C_0, and the size (Lc) of crystallite in a C-axis direction is at least 1000 angstroms or more which corresponds to 100 nm or more (paragraph 22). Furthermore, Kitagawa et al. teaches a spherical graphite and therefore the radius in other planes such as the a-axis should corresponds with the length of the c –axis (paragraph 28, line 6).

3. Regarding claim 4, Kitagawa et al. teaches mean particle size or 10 to 30 microns which overlaps with 10 to 40 microns (paragraph 24).

4. Regarding claim 5, Kitagawa et al. teaches the shape factor should be spherical, with a mean roundness (the ratio of the peripheral length of a circle corresponding to

the particle area as the numerator to the peripheral length of the projected particle image as the denominator, which becomes closer to 1 when the particle image is closer to true roundness, and becomes smaller as the particle image is slender or rugged) of 0.940 or more which overlaps with a mean roundness of 0.85 to 0.99 (paragraph 28, lines 14-20).

5. Regarding claim 6, Kitagawa et al. teaches the Raman Spectroscopy intensity ratio is 0.3 or less (paragraph 23).

6. Regarding claim 7 and 11, Examiner takes the position that the graphite carbon taught by Kitagawa would obviously posses the limitations recited by applicant because Kitagawa recites limitations which are commensurate with applicant's limitations (paragraph 22-27).

7. Regarding claim 8, Kitagawa et al. teaches organic carbon precursor (paragraph 31).

8. Regarding claim 9, Kitagawa et al. teaches the rate of the carbonaceous matter (organic carbon precursor) in the carbonaceous powder of plural-layer structure is adjusted to be 0.1 wt % or more and not exceeding 50 wt (paragraph 32, lines 7-10).

9. Regarding claims 10 and 11, Kitagawa et al. teaches the lumpy graphite particles having the above characteristics (1) to (6) are composed of natural or artificial scaly or flaky graphite of high purity and high crystallinity (paragraph 28, lines 1-3). Furthermore examiner takes the position that the graphite described by Kitagawa would obviously posses the crystalline/ amorphous regions recited by applicant because Kitagawa

recites limitations which are commensurate with applicant's limitations (paragraph 22-27).

10. Regarding claim 21, most of the limitations recited in claim 21 have been addressed in previous claims. Please see arguments supra. Furthermore, Kitagawa et al. teaches BET specific surface area is 3.5 to 10.0 m^2/g which overlaps with 0.2 to 5 TAP density is different method of measuring density than true density. However, Examiner takes the position that the graphite described by Kitagawa would obviously posses the density requirements recited by applicant because Kitagawa recites limitations which are commensurate with applicant's limitations (paragraph 22-27).

11. Regarding claim 22, Kitagawa et al. teaches the graphite particles that have thus been selected should preferably have a specific capacity of 330 mAh/g or more, more preferably 350 mAh/g or more (paragraph 30, lines 3-6).

12. Regarding claim 28, Kitagawa et al. teaches a paste for producing a battery electrode (paragraph 76, lines 6-10).

13. Regarding claim 29, Kitagawa et al. teaches applying this paste on both sides of an aluminum foil used as a current collector, drying and pressing it by a roll, and cutting it to a prescribed size which corresponds to an electrode formed of a compact of a paste (paragraph, 76, lines 10-13).

14. Regarding claim 30, please see claim 1 supra.

15. Regarding claims 31, Kitagawa et al. teaches battery using carbonaceous powder (paragraph 49, line 1).

16. Regarding claim 32, Kitagawa et al. teaches a nonaqueous secondary cell (abstract, line 3).

17. Regarding claim 33, Kitagawa et al. teaches ethylene carbonate and diethyl carbonate which correspond to the non-aqueous solvents recited by applicant (paragraph 70, lines 19-22).

18. Claims 1, 2, 6-8, 10, 11, 13-20, 22, and 28-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wilde et al. (U.S. Pub. No. 2003/0194557 A1).

19. Wilde et al. teaches a carbon electrode substrates for electrochemical cells wherein a mixture of carbon fibers, carbonaceous particles in a solution or dispersion of binder polymers is prepared, heated to a temperature for impregnating, carbonizing and graphitizing (abstract; paragraphs 29-31; paragraphs 43-64). Wilde et al. teaches graphite (paragraph 64). Examiner takes the position that the materials and methods are commensurate with applicant's recited method of making and therefore the carbon electrode taught by Wilde et al. would obviously posses the properties claimed by applicant.

20. Regarding claims 17-20, Wilde et al. teaches graphitic nanofibers which is known in the art to be vapor grown (paragraph 64).

21. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art cited as applied to claim 1 above, and further in view of Yin et al. (The effect of

Boron Doping on Lithium Intercalation Performance of Boron-Doped Carbon Materials; Material of Chemistry and Physics; 80, 94-101; 2003).

22. Kitagawa teaches enhancement of the storage property at a high temperature and discharge characteristics at a low temperature of a nonaqueous electrolyte secondary cell (abstract, lines 1-4). Kitagawa does not teach doping the carbon material with boron. Yin et al. teaches boron-doped carbon posses an increased reversible capacity and the boron doping the reversible capacity of lithium intercalation and the decrease of irreversible capacity which all attribute the improving the improved function of battery electrodes. It would have been obvious to one of ordinary skill in the art at the time of the invention to dope the carbon material used by Kitagawa et al. because boron-doped carbon further improves the efficiency of battery electrodes.

23. Claims 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitagawa et al. as applied to claim 1 above, and further in view of Morita et al. (U.S. Pub. No. 2003/0044603 A1).

24. Kitagawa teaches enhancement of the storage property at a high temperature and discharge characteristics at a low temperature of a nonaqueous electrolyte secondary cell (abstract, lines 1-4). Kitagawa et al. does not teach carbon fibers.

25. Morita et al. teaches a battery electrode containing the fine carbon fiber so as to attain improved charge/discharge capacity and exhibit improved strength, the battery electrode being employed as a positive or negative electrode of any of a variety of secondary batteries such as dry batteries, Pb storage batteries, capacitors, and recently

developed Li-ion secondary batteries (paragraph 3). Morita et al. teaches an electrode; for example, a negative electrode of a lithium battery, is formed from the fine carbon fiber of the present invention, the fine carbon fiber and a binder are added to a carbonaceous material such as graphite powder or mesophase carbon micro beads (MCMB), and the resultant mixture is sufficiently kneaded such that the carbon fiber is dispersed in the mixture as uniformly as possible (paragraph 73). Morita et al. teaches a vapor grown fine carbon fiber including a hollow space along the fiber in its interior, and having a multi-layer structure, an outer diameter of 2 to 500 nm, and an aspect ratio of 10 to 15,000 is disclosed (abstract, lines 1-4). Furthermore, Morita et al. teaches By virtue of its high electrical conductivity, when the fine carbon fiber of the present invention is employed in such a battery, the electrical conductivity of the resultant battery can be enhanced (paragraph 71, lines 1-4). Furthermore, Morita et al. teaches when the fine carbon fiber is employed in a lithium battery, the charge/discharge capacity of the battery can be increased, since the fine carbon fiber exhibits high intercalation performance as a carbon material for a negative electrode (paragraph 71, lines 4-8). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate carbon fibers in the carbonaceous material taught by Kitagawa because vapor grown carbon fibers enhance battery electrode performance.

26. Regarding claim 14, Kitagawa et al. does not teach addition of carbon fibers to battery electrodes. Morita et al. an electrode; for example, a negative electrode of a lithium battery, is formed from the fine carbon fiber of the present invention, the fine carbon fiber and a binder are added to a carbonaceous material such as graphite

powder or mesophase carbon micro beads (MCMB), and the resultant mixture is sufficiently kneaded such that the carbon fiber is dispersed in the mixture as uniformly as possible (paragraph 73, lines 3-7). Examiner takes the position that at least a portion of the carbon fiber will be deposited on a surface of the carbon material by adding fine carbon fibers and binder to graphite and mixing the composite. It would have been obvious to one of ordinary skill in the art at the time of the invention to add carbon fiber to a graphite composite binder because the carbon fibers enhance battery electrode performance.

27. Regarding claim 15, Kitagawa does not teach addition of carbon fibers to battery electrodes. Morita et al. teaches the amount of fine carbon fiber incorporated into an electrode (comprised of fine carbon fiber in accordance with the present invention and fine carbon fiber that is not in accordance with the present invention) is preferably 0.1 mass % to 20 mass % inclusive (paragraph 72). When the incorporation amount exceeds 20 mass %, the packing density of carbon in the electrode is lowered, thereby lowering the charge/discharge capacity of the resultant battery. In contrast, when the incorporation amount is less than 0.1 mass %, the effect of the fine carbon fiber is lowered (paragraph 72). The fine carbon fiber of the present invention is incorporated into the electrode in an amount of 2 to 100 vol. %, preferably 5 to 80 vol. %, more preferably 15 to 50 vol. %, on the basis of the total volume of fine carbon fiber incorporated into the electrode (paragraph 72). It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the proper amount of carbon fibers into the composite taught by Kitagawa et al. so that the battery electrode

performance is improved but yet quality factors such as packing density are not sacrificed.

28. Regarding claim 16, Kitagawa et al. does not teach carbon fibers for battery electrodes. Morita et al. teaches carbon fibers with an aspect ratio of 10 to 15000 are added to battery electrodes to further enhance electrode functionality (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to add fibers to a battery electrode to improve the function of the battery.

29. Regarding claim 17, Kitagawa et al. does not teach carbon fibers. Morita et al. teaches a fine carbon fiber obtained through heat treatment of a fine carbon fiber as recited in any one of 1) through 5) above at about 2,000 to about 3,500.degree. C is used to enhance a battery electrode (paragraph 24).

30. Regarding claim 18, Kitagawa et al. does not teach carbon fibers for battery electrodes. Morita et al. teaches a vapor grown fine carbon fiber including a hollow space along the fiber in its interior enhance battery electrode (abstract, lines 1-2). It would have been obvious to one of ordinary skill in the art at the time of the invention to add carbon fibers to the carbon electrode taught by Kitagawa because hollow carbon fibers improve the functionality of battery electrodes.

31. Regarding claims 19-20, Kitagawa et al. does not teach carbon fibers. Morita et al. teaches vapor grown carbon fibers (VGCF) which is commensurate with all the limitations recited in claims 12-18 of the application (see arguments supra). Morita et al. does not teach branching or spacing between the interlayer planes. However, Examiner takes the position that since Morita teaches a fiber produced by the same

method recited by applicant (vapor grown and heat treated) then Morita VGCF would be branched and posses the recited interlayer spacing. Furthermore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use branched carbon fibers with a interlayer spacing of 0.344 nm or more obtained by vapor phase growth because the carbon fibers would enhance the battery electrode's functionality.

Response to Arguments

32. Applicant's arguments filed 06/15/2009 have been fully considered but they are not persuasive.

33. As applicant stated in the Remarks from 06/15/2009, the carbon material "comprises a carbon powder materials as a composite of carbonaceous particles and a carbon material derived from an organic compound prepared by allowing the organic compound serving as a polymer source material to deposit onto and/or permeate into the carbonaceous particles to thereby polymerize the polymer material and then heating at 1800 to 3300 ºC". Examiner takes the position that the prior art of record teaches methods which are not patentably distinguishable from the applicant's method and would therefore produce a carbon material with applicant's claimed properties. As stated supra the materials are commensurate with the materials used by applicant and the method are commensurate with applicant's method. Examiner agrees with the applicant that the measurements recited by the prior art were taken under different conditions that the measurements taken by applicant. Unfortunately, Examiner does not possess the resources to test the various materials of the prior art to compare with

the applicant's claimed invention. Therefore, unless applicant can show the difference between the prior arts method of making and the applicant's method of making or perhaps prove the structural differences between the prior art and the applicant's material Examiner is maintaining the rejection for the reasons given.

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GUINEVER S. GREGORIO whose telephone number is (571)270-5827. The examiner can normally be reached on Monday-Thursday, 10:30-5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curt Mayes can be reached on 571-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gsg
October 1, 2009

/Melvin Curtis Mayes/
Supervisory Patent Examiner, Art Unit 1793